

CLAIMS

1. An electromechanical transducer comprising at least two transducer elements which have a multilayer structure each comprising at least two layers such that the transducer elements are capable of changing their thickness, the transducer elements being formed to allow air to flow inside the transducer element in the direction of thickness thereof and the transducer further comprising controlling means for controlling the transducer elements such that the centre of mass of the transducer is moved and/or a signal is generated from the movement of the centre of mass.
2. A transducer as claimed in claim 1, wherein the electromechanical transducer is provided with at least one air impermeable layer.
3. A transducer as claimed in claim 1, wherein the transducer elements are separately controllable.
4. A transducer as claimed in claim 1, wherein electromechanical transducer comprises at least two transducer elements with an air impermeable layer arranged therebetween.
5. A transducer as claimed in claim 1, wherein the outer surface of the transducer elements is provided with an air impermeable layer such that air is allowed to flow from a first transducer element to and back from a second transducer element through the surface against the second transducer element.
6. A transducer as claimed in claim 1, wherein the electromechanical transducer comprises at least one air permeable additional mass.
7. A transducer as claimed in claim 1, wherein the transducer is provided with a feedback arrangement for linearizing the operation of the transducer.
8. A transducer as claimed in claim 7, wherein the feedback arrangement comprises a sensor for measuring the pressure on the surface of the transducer, the pressure being utilized in the feedback.
9. A transducer as claimed in claim 1, wherein the transducer comprises filtering means arranged to filter a signal to be fed into different layers such that certain frequencies are filtered off from the signals to be fed into the different layers.
10. A transducer as claimed in claim 9, wherein no frequencies are substantially filtered off from a signal to be fed into the outer layers of the

transducer while higher frequencies are filtered off from a signal to be fed into the inner layers.

11. A transducer as claimed in claim 9 or 10, wherein the signal is filtered using resistors.

5 12. A transducer as claimed in claim 1, wherein a layer of the transducer element comprises a porous layer made of a nonwoven material.

13. A transducer as claimed in claim 12, wherein the surface of the porous layer is provided with an electrically conductive metal layer by vacuum evaporation.

10 14. A transducer as claimed in claim 12, wherein the porous layer made of a nonwoven material is manufactured from an electrically conductive material.

15 15. A transducer as claimed in claim 1, wherein the transducer element is constructed of magnetized layers with air gaps therebetween, current conductors being arranged between the magnetized layers.

16. A transducer as claimed in claim 1, wherein a layer of the transducer element comprises a porous layer whose surface is provided with an electret layer such that the electret layer is constructed of separate points, zones or stripes of an electret material.

20 17. A method for transforming energies from mechanical energy into electric energy and/or vice versa, in which method a transducer is produced which transducer comprises at least two transducer elements, which have a multilayer structure each comprising at least two layers such that the transducer elements are capable of changing their thickness the transducer elements allowing air to flow inside a transducer element in the direction of thickness thereof, and the transducer elements are controlled such that the centre of mass of the transducer moves or a signal is generated from the movement of the centre of mass.

30 18. A method as claimed in claim 17, wherein different transducer elements are controlled by the same control signal but at two different transducer elements, the effect of the control signal is of opposite phase.

19. A method as claimed in claim 17, wherein the transducer elements are controlled separately.

35 20. A method as claimed in claim 17, wherein the electromechanical transducer comprises at least one air impermeable layer, the electromechanical transducer being used for producing air pressure or vibration.

21. A method as claimed in claim 17, wherein the operation of the transducer is linearized by means of feedback.

22. A method as claimed in claim 21, wherein the pressure on a surface of the transducer is measured for the feedback.

5 23. A method as claimed in claim 17, wherein a signal is fed into different layers of the transducer element such that certain frequencies have been filtered off from the signals fed into the different layers.

10 24. A method as claimed in claim 23, wherein a signal with substantially all frequencies is fed into a layer on the outer surface of the transducer while a signal wherefrom higher frequencies have been filtered off is fed into a layer in the middle of the transducer.

25. A method as claimed in claim 23 or 24, wherein the higher frequencies are filtered off from the signal by means of resistors.